

CLAIMS

What is Claimed is:

- 1 1. A process for further purifying a preprocessed zinc oxide containing
2 residue comprising thermally processing the material at a temperature between
3 400 and 700°C for a period of time.
- 1 2. The process as claimed in Claim 1, wherein the temperature is
2 greater than 600°C.
- 1 3. The process as claimed in Claim 2, wherein the temperature is
2 between 600°C and 700°C.
- 1 4. The process as claimed in Claim 1, wherein the time period is
2 greater than 5 minutes.
- 1 5. The process as claimed in Claim 4, wherein the time period is
2 greater than 1 hour.
- 1 6. The process as claimed in Claim 5, wherein the time period is
2 greater than 2 hours.
- 1 7. The process as claimed in Claim 1, whereby the product comprises
2 zinc oxide and has a surface area between 4 and 6 square-meters per gram.
- 1 8. The process as claimed in Claim 1, wherein the process is the final
2 step after a prior purification process.
- 1 9. The process as claimed in Claim 1, whereby the process improves
2 the purity of the zinc containing material from under 60 percent to over 60 percent
3 by mass.
- 1 10. The process as claimed in Claim 1, wherein the process improves
2 the purity of zinc oxide from under 98 percent to over 98 percent by mass.
- 1 11. The process as claimed in Claim 1, wherein the process improves
2 the purity of zinc oxide to greater than 98 percent by mass.
- 1 12. The process as claimed in Claim 1, resulting in a zinc oxide product
2 has a surface area of between 3 m²/g and 7 m²/g.
- 1 13. The process as claimed in Claim 12, wherein the zinc oxide product
2 has a surface area of between 4 m²/g and 6 m²/g.

1 14. The process as claimed in Claim 10, resulting in a zinc oxide product
2 has less than 0.8% chlorides by mass.

1 15. The process as claimed in Claim 14, wherein the zinc oxide product
2 has less than 0.4% chlorides by mass.

1 16. A method of recovering zinc oxide from a metal waste containing
2 zinc oxide state and impurities comprising:

3 a. a preliminary process comprising mixing the waste and a reducing
4 material to create a preprocessed zinc oxide containing material; and

5 b. a purification process of thermally processing the preprocessed zinc
6 oxide containing material for a defined period of time.

1 17. The method according to Claim 16, wherein the preprocessed
2 material is thermally processed at a temperature greater than 400°C.

1 18. The method according to Claim 17, wherein the preprocessed
2 material is thermally processed at greater than 600°C.

1 19. The method as claimed in Claim 18, wherein the preprocessed
2 material is thermally treated at a temperature of between 600° and 700°C.

1 20. The method as claimed in Claim 16, wherein the defined period of
2 time is greater than 5 minutes

1 21. The method as claimed in Claim 20, wherein the defined period of
2 time is greater than 1 hour.

1 22. The method as claimed in Claim 21, wherein the defined period of
2 time is greater than 2 hours.

1 23. The method as claimed in Claim 16, wherein the process improves
2 the purity of zinc oxide in the material.

1 24. The process as claimed in Claim 16, resulting in a zinc oxide product
2 has a surface area of between 3 m²/g and 7 m²/g.

1 25. The process as claimed in Claim 24, wherein the zinc oxide product
2 has a surface area of between 4 m²/g and 6 m²/g.

1 26. The process as claimed in Claim 23, resulting in a zinc oxide product
2 has less than 0.8% chlorides by mass.

1 27. The process as claimed in Claim 26, wherein the zinc oxide product
2 has less than 0.4% chlorides by mass.

1 28. A method for recovering zinc oxide from a metal waste containing
2 zinc oxide and impurities comprising:

3 processing the waste with a reducing material to create a preprocessed
4 zinc oxide containing material;

5 heating the zinc oxide containing material at a temperature above 400°C
6 for a period of time greater than 5 minutes,

7 whereby the heating of the zinc oxide containing material increases the
8 purity of the zinc oxide without substantially degrading the surface area of the
9 material.

1 29. The method as claimed in Claim 28, wherein the temperature is
2 above 600°C.

1 30. The method as claimed in Claim 29, wherein the temperature is
2 between 600°C and 700°C.

1 31. The method as claimed in Claim 30, wherein the temperature is
2 683°C.

1 32. The process as claimed in Claim 28, resulting in a zinc oxide product
2 has a surface area of between 3 m²/g and 7 m²/g and has less than 0.8%
3 chlorides by mass.

1 33. The process as claimed in Claim 32, wherein the zinc oxide product
2 has a surface area of between 4 m²/g and 6 m²/g and has less than 0.4%
3 chlorides by mass.

1 34. A method for recovering zinc oxide from a metal waste containing
2 zinc oxide and impurities comprising:

3 processing the waste with a reducing material to create a preprocessed
4 zinc oxide containing material;

5 heating the zinc oxide containing material at a temperature between 600°C
6 and 700°C for a period of time between 5 minutes and 2 hours,

7 whereby the heating of the zinc oxide containing material increases the
8 purity of the zinc oxide without substantially degrading the surface area of the
9 material.

1 35. The method as claimed in Claim 34, wherein the temperature is
2 between 620°C and 700°C.

1 36. The method as claimed in Claim 35, wherein the time is between 20
2 minutes and 2 hours.

1 37. The process as claimed in Claim 36, resulting in a zinc oxide product
2 has a surface area of between 3 m²/g and 7 m²/g and has less than 0.8%
3 chlorides by mass.

1 38. The process as claimed in Claim 37, wherein the zinc oxide product
2 has a surface area of between 4 m²/g and 6 m²/g and has less than 0.4%
3 chlorides by mass.